Fig 4

PGH Line-up (nt):


```
PGTCD          1 ---------- ---------- ---------- ---------- ----------    50
BOVGSTA        1 CCGCGCGCCG CGCCGAGCTG CGAGCGTCGA CGCCGCTGCC CACGCCGCGC    50
MUSGLYTNG      1 ---------- ---------- ---------- ---------- ----------    50

PGTCD         51 ---------- ---------- ---------- ---------- ----------   100
BOVGSTA       51 CGGCTCGCTC GCGCCGCTGC CGCCGCCGCC GCACCACCGC CGCCGCCGCG   100
MUSGLYTNS     51 ---------- ---------- ---------- ---------- ----------   100

PGTCD        101 ---------- ---------- ---------- ---------- ----------   150
BOVGSTA      101 GCCCACCGCA GCGCACCGCC ACACCGCCGC CGCCCACCGC CGCCGCGCTC   150
MUSGLYTNS    101 ---------- ---------- ---------- ---------- ----------   150

PGTCD        151 ---------- ---------- ---------- ---------- ----------   200
BOVGSTA      151 GCCAGCACGC AGCGCGCCGA CTCTTCCGCC AGCCGACGAC CGCCGCGCCG   200
MUSGLYTNS    151 ---------- ---------- ---------- ---------- ----------   200

PGTCD        201 ---------- ---------- ---------- ---------- ----------   250
BOVGSTA      201 AGCCGAGCCG CCGGCCAGCC CCCAGCCGCC CCAGCTTCTG CGGATCAGCG   250
MUSGLYTNS    201 --------CG TCTTAGGAGG CTGGAGATTC TGGGTGGAGC CCTAGCCCTG   250

PGTCD        251 ---------- ---------- ---------- ---------- ----------   300
BOVGSTA      251 AAACCACCTG TCCTCAAGTG GCCAGCCAGC TCTCCCCAAG AGCAACTTGC   300
MUSGLYTNS    251 CCTTTTCTTA GCTGGCTGAC ACCTTCCCTT GTAGACTCTT CTTGGAATGA   300

                                                   Exon 1 | Exon 2
PGTCD        301 ---------- ---------- ---------- ---------- ----------   350
BOVGSTA      301 CTGGCATTTG CACGGAAACA CGAGACACTT CACAAAATCA ACGCAGTCAG   350
MUSGLYTNS    301 GAACTACCGA TTCTGCTGAA GACCTCGCGC TCTCAGCCTC TGGGAGTTGG   350

PGTCD        351 ---------- ---------- -------AGC CCTGCCTCCT TCTCCAGACC   400
BOVGSTA      351 AAGGCTGCAC CTTCGCTTCC TCCC---AGC CCTGCCTCCT TCTCCAGAAC   400
MUSGLYTNS    351 AACCCTGTAC CTTCCTTTCC TCTCCTGAGC CCTGCCTCCT TCTCCAGCCC   400

PGTCD        401 ACAGCTCACT AGAACTT-GT TTC----GCC TTTTACTCTG GCCCGACACA   450
BOVGSTA      401 GGAGCTCACT AGAACTT-GC TACTTTTGCC TTTTACTCTA GCAGGAGACA   450
MUSGLYTNS    401 ACAGCTCCAC ACAAGCTCCG TTGCTTTCCT CTTTGCTTTG CAGCGAACAC   450

                    Exon 2 | Exon 3
PGTCD        451 ACCAGACCAT GAG------- ---------- ---------- ----------   500
BOVGSTA      451 ACCAGACCAT GAG------- ---------- ---------- ----------   500
MUSGLYTNS    451 ACCTCACCAT GACGCTCACT TTCAACTCAA GACATCTGCT TACCCCAGTC   500

PGTCD        501 ---------- ---------- ---------- ---------- ----------   550
BOVGSTA      501 ---------- ---------- ---------- ---------- ----------   550
MUSGLYTNS    501 TCCTCGAATT AAACCCCTCT ACTACCTTCC CTCCACCTAA GATTTTCATC   550

PGTCD        551 ---------- ---------- ---------- ---------- ----------   600
BOVGSTA      551 ---------- ---------- ---------- ---------- ----------   600
MUSGLYTNS    551 ATCACTATGC TTCAAGATCT CCATGTCAAC AACATCTCCA TGTCAAGATC   600
```

Fig 4 (cont) 4-2

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                                                              Exon 3 ↓ Exon 4
PGTCD      601 ---------- ---------- ---------- ---------- ---CAGAAAA   650
BOVGSTA    601 ---------- ---------- ---------- ---------- ---CAGAAAA   650
MUSGLYTNS  601 CAAGTCAGAA ACAAGTCTTC CATCCTCAAC ATCTCCATCA CACCAGAAAA   650

                START
PGTCD      651 TAATGAATGT CAAAGGAAGA GTGGTTCTGT CAATGCTGGT TGTCTCAACT   700
BOVGSTA    651 TAATGAATGT CAAAGGAAAA GTGATTCTGT CAATGCTGGT TGTCTCAACT   700
MUSGLYTNS  651 TAATGAATGT CAAGGGAAAA GTAATCCTGT TGATGCTGAT TGTCTCAACG   700

                                           Exon 4 ↓ Exon 5
PGTCD      701 GTAATGGTTG TGTTTTGGGA ATACATCAAC ACCCCAGAAG GTTGTTTGTT   750
BOVGSTA    701 GTCATTGTTG TGTTTTGGGA ATATATCCAC ACCCCAGAAG GCTGTTTGTT   750
MUSGLYTNS  701 GTGGTTGTGG TGTTTTGGGA ATATGTCAAC ACCCCAGACG GCTGTTTGTT   750

                       Exon 5 ↓ Exon 6
PGTCD      751 GTGGATATAC CAGTCAAAAA ACCCAGAAGT TGGCAGCACT GCTCAGAGGG   800
BOVGSTA    751 GTGGATAAAC CCATCAAGAA ACCCAGAAGT TGGTGGCAGC AGCATTCAGA   800
MUSGLYTNS  751 GTGGATATAT CACACAAAAA TTCCAGAGGT TGGTGAGAAC AGATGGCAGA   800

                                        Exon 6 ↓ Exon 7
PGTCD      801 GCTGGTGG-- -TTTCCGAGC TGGTTTAACA ATGGGACTCA CAGTTACCAC   850
BOVGSTA    801 ACGGCTGGTG GCTTCCGACA TGGTTTAACA ATG------- --GTTACCAT   850
MUSGLYTNS  801 ACCACTGGTG GTTCCCAAGC TGGTTTAAAA ATGGGACCCA CAGTTATCAA   850

PGTCD      851 CAACAAGAAG ACCCTATAGG CAACGAAAAG GAACAAAGAA AACAAGACAA   900
BOVGSTA    851 CAAGAAGATG CAGACATAAA CGAAGAAAAG GAACAAACAA ACCAAGACCA   900
MUSGLYTNS  851 CAAGACAACG TAGAAGGACG GAGACAAAAG CGTACAAATG GACATGGCAT   900

                                             Exon 7 ↓ Exon 8
PGTCD      901 CAGAGGAGAG CTTCCGCTAG TGGACTGGTT TAATCCTGAG AAACGCCCAG   950
BOVGSTA    901 ---AAGGAAG CTTAAGCTAT CGGACTGGTT CAACCCATTT AAACGCCCGG   950
MUSGLYTNS  901 ---TGAAGAG CCTCAGCTAT GGGACTGGTT CAATCCAAAG AACCGCCCCG   950

PGTCD      951 AGGCTGTGAC CATAACCAGA TGGAAGGCTC CAGTGGTATG GGAAGGCACT   1000
BOVGSTA    951 AGGTTGTGAC CATGACCAAC TGGAAGGCTC CAGTGCTGTG CGAAGGCACT   1000
MUSGLYTNS  951 ATGTTTTCAC ACTGACCCCG TGGAAGCCGC CGATTGTGTG GGAAGGCACT   1000

PGTCD     1001 TACAACAGAG CCGTCTTACA TAATTATTAT GCCAAACACA AAATTACCGT   1050
BOVGSTA   1001 TACAACAGAG CCGTCTTACA CAATTATTAT GCCAAGCACA AAATTACCGT   1050
MUSGLYTNS 1001 TATGACACAC CTCTGCTGGA AAAGTACTAC GCCACACAGA AACTCACTGT   1050

                                 Exon 8 ↓ Exon 9
PGTCD     1051 CCGCTTCACG GTTTTTGCTG TCGCAACATA CATTGAGCAT TACTTGGAGG   1100
BOVGSTA   1051 CCGCCTCACG GTTTTCGCCG TCGCAAGATA CATTGAGCAT TACTTGGAGG   1100
MUSGLYTNS 1051 GGGGCTCACA GTGTTTGCTG TCGCAAAGTA CATTGAGCAT TACTTAGAAG   1100

PGTCD     1101 AGTTCTTAAT ATCTGCAAAT ACATACTTCA TGGTTGGCCA CAAACTCATC   1150
BOVGSTA   1101 AGTTCTTAAC GTCTGCTAAT AAGCACTTCA TGGTGGGCCA CCCAGTCATC   1150
MUSGLYTNS 1101 ACTTTCTGGA GTCTGCTGAC ATCTACTTCA TGGTTGCCCA TCGGGTCATA   1150

PGTCD     1151 TTTTACATCA TGGTGGATGA TATCTCCAGC ATGCCTTTCA TACAGCTGGG   1200
BOVGSTA   1151 TTTTATATCA TGGTAGATGA TGTCTCCAGC ATGCCTTTCA TACAGTTGGG   1200
MUSGLYTNS 1151 TTTTACGTCA TGATAGATGA CACCTCCCCG ATGCCTGTCG TGCACCTGAA   1200

PGTCD     1201 TCCTCTCCGC TCCTTTAAAG TGTTTGACAT CAACTCCCAG AAGAGGTGGC   1250
BOVGSTA   1201 TCCTCTCGGC TCCTTCAAAG TGTTTAACAT CAACCCTCAC AACAGGTGGC   1250
MUSGLYTNS 1201 CCCTCTACAT TCCTTACAAG TCTTTGACAT CAGCTCTCAC AACAGGTGGC   1250
```

Fig 4 (cont) 4-3

```
PGTCD       1251 AAGAGATCAG CATGATGGGC ATGAAGACCA TGGGGGAGCA CATCGTGGGC 1300
BOVGSTA     1251 AGGACATCAG CATGATGGGC ATGAAGACTA TGGGGGAGCA CATTGTGGGC 1300
MUSGLYTNS   1251 AGGATATCAG CATGATGGGC ATGAAGACCA TTGGGGAGCA CATCGTGGGC 1300

PGTCD       1301 CACATCCAGC ACGACGTGGA CTTCGTCTTC TGCATCCACG TGGATCAGGT 1350
BOVGSTA     1301 CACATCCAGC ATGACGTTGA CTTCGTTTTC TGCATCGATC TGGACCAGGT 1350
MUSGLYTNS   1301 CACATCCAGC ACGACGTCGA CTTCGTCTTC TGCATCGACC TGGATCAAGT 1350

PGTCD       1351 CTTCGAAAAC AACTTTGGGG TGGAGACCGT GGGCCAGTCG GTCGCTCAGC 1400
BOVGSTA     1351 CTTCGAAGAC AAGTTTGGGG TGGAGACCGT GGGCGAGTCG GTCGCCAAGC 1400
MUSGLYTNS   1351 CTTTCAAGAC AACTTCGGGG TGGAAACTGT GGGCCAGCTG GTAGCAAAGC 1400

PGTCD       1401 TACAGGCCTG GTGGTACAAG GCAGATCCTG ACGAGTTCAC CTACCAGAGG 1450
BOVGSTA     1401 TACAAGCCTG GTGGTACAAG GCAGATCCCA ATGACTTCAC CTACCAGAGC 1450
MUSGLYTNS   1401 TCCAGGCCTG GTGGTACAAG GCCAGTCCCG ACGACTTCAC CTATGAGAGG 1450

PGTCD       1451 CGCAACCAGT CGCCAGCCTA CATTCGCTTT GGCCAGGGGG ATTTTTATTA 1500
BOVGSTA     1451 CGCAAGCAGT CTGCAGCATA CATTCGCTTC GGCGAAGGGG ATTTTTATTA 1500
MUSGLYTNS   1451 CGCGAACTGT CGCCCGCGTA CATTCGATTC GGCAGAGGGG ATTTTTACTA 1500

PGTCD       1501 CCACCCAGCC ATTTTTGGGG GAAGACCCAC TCAGCTTCTA AAGATCAGTC 1550
BOVGSTA     1501 CCATCCAGCC ATTTTTGGGG GAAGATCCAC TCAGGTCCTT AAGATCAGCC 1550
MUSGLYTNS   1501 CCACCCCGCC ATTTTTGGAG GAAGCCCTAC TCAGATTCTC AAGCTCAGCA 1550

PGTCD       1551 AGGAGTGCTT CAAGGGAATC CTCCAGGACA ACGAAAATGA CATAGAAGCC 1600
BOVGSTA     1551 AGGAATGCTT CAAAGGAATC CTCAAGGACA AGAAAAATGA CATAGAAGCC 1600
MUSGLYTNS   1551 GGGAGTGCTT TAAGCCCATC CTCCAGCACA AGAAACATGA CATAGAAGCC 1600

PGTCD       1601 CAGTGGCATG ATGAAAGCCA TCTAAACAAG TATTTCCTTC TCAACAAACC 1650
BOVGSTA     1601 CAATGGCATG ATGAAACCCA TCTAAACAAG TATTTCCTTC TCAACAAACC 1650
MUSGLYTNS   1601 CAGTGGCATG ATGAGAGCCA CCTCAACAAA TACTTCCTTT TCAACAAACC 1650

PGTCD       1651 CACTAAAATC TTATCCCCAG AATACTGCTG GGATTATCAT ATAGGCATGT 1700
BOVGSTA     1651 TACTAAAATC TTATCCCCGG AATACTGCTG GGATTATCAC ATAGGCCTAC 1700
MUSGLYTNS   1651 CACTAAAATC CTATCTCCAG AGTATTGCTG GGACTATCAG ATAGGCCTGC 1700

PGTCD       1701 CTGTCGATAT TAGCATTGTC AAGATAGCTT GCCAGAAAAA AGACTATAAT 1750
BOVGSTA     1701 CTCCGCATAT TAAGCTTGTC AAGATGTCTT GCCAGACAAA AGACTATAAT 1750
MUSGLYTNS   1701 CTTCAGATAT TAAAAGTGTC AAGGTAGCTT GCCAGACAAA AGAGTATAAT 1750

                                    Stop
PGTCD       1751 TTGCTTAGAA ATAAGATGTG ACTTTAAATT GTGCCAGCAG TTTTCTGAAT 1800
BOVGSTA     1751 GTGCTTAGAA ATAATGTGTG ACTT------T GTGCCAGTAC ATTTCTGAAT 1800
MUSGLYTNS   1751 TTGCTTAGAA ATAATGTGTG ACTTCAAATT GTG------- --ATGGAAAC 1800

PGTCD       1801 TTCAAACAGT ATTACTCTGG CTACTTCCTC ACACAAGTAC ---CACTTAA 1850
BOVGSTA     1801 TTCACACAGT ATTATTCTGC CTACTTCCTC ACAAAAGTAA ---CACTTAA 1850
MUSGLYTNS   1801 TTCACAC--T ATTACTCTGC CTAATTCCTC AAACAAGTAC CAACACTTGA 1850
```

Fig. 4(cont) 4 - 4

```
PGTCD      1851 TTTTAACTTT TAAAAAAATA CTAACAAAA- ----TACCTA CACAGTAA-G 1900
BOVGSTA    1851 TTTTAACTTA AAAAAAAATA CTTACAAAA- ----GACCTA CACAGCAA-A 1900
MUSGLYTNS  1851 TTTCAACTTT TAAAAGA-A CAATCAAAAC CAAAACCCAC TACCATGGCA 1900

PGTCD      1901 TACATATTAT TCTTCCTTGC AACTTTGAGC CTTGTCAAAT GCCACAATCA 1950
BOVGSTA    1901 TACATATTAT TTCTCCTTGT AACTTTGAGC CTTGTAATAC GCCACAATCA 1950
MUSGLYTNS  1901 AACAGATGAT TTCTCCT-CA CACCTTGAGC CT-GTAATAC GTCACAAACA 1950

PGTCD      1951 GTCTGTGG-- --TAATCAGA TGTAAATTCC GAGTGATTTC ..........  2000
BOVGSTA    1951 ACGTGTGG-- --TAATCAGA TGTAAATTCC GAGTGATTTC TTACTTATTT  2000
MUSGLYTNS  1951 GTCTATGGCA AGTAATCAGG TATAAATTGT CAATGATTTC TTATATATTC  2000

PGTCD      2001 .......... .......... .......... .......... ..........  2050
BOVGSTA    2001 TTGCTTCTGG GCCCCCCCAA TCCATACACC ATCAGTTGAA CC........  2050
MUSGLYTNS  2001 TCGCTCTTGG GAAAACTTCA TTCTAGAAAT CAAAATTAAT TTCACAAACC  2050

PGTCD      2051 .......... .......... .......... .......... ..........  2100
BOVGSTA    2051 .......... .......... .......... .......... ..........  2100
MUSGLYTNS  2051 AAAAGCACAT GCCCGAAACT TCTTCCCAGT CTGTCATACA ATTCACCACT  2100

PGTCD      2101 .......... .......... .......... .......... ..........  2150
BOVGSTA    2101 .......... .......... .......... .......... ..........  2150
MUSGLYTNS  2101 GCCCAGCTGC TCACACAACC ATTAGGGAAC ACTGTCCCTT GTGTCAGACT  2150

PGTCD      2151 .......... .......... .......... .......... ..........  2200
BOVGSTA    2151 .......... .......... .......... .......... ..........  2200
MUSGLYTNS  2151 TCCACCCCTC CATCCCTTTA GCTTCATTAT CTTCCTCCTC ATCCCAGATC  2200

PGTCD      2201 .......... .......... .......... .......... ..........  2250
BOVGSTA    2201 .......... .......... .......... .......... ..........  2250
MUSGLYTNS  2201 TAAAGCAACC CACACACCCT TTCCAGCCAC ACACCTTCAA TAACCATCCC  2250

PGTCD      2251 .......... .......... .......... .......... ..........  2300
BOVGSTA    2251 .......... .......... .......... .......... ..........  2300
MUSGLYTNG  2251 AATGTCACCA TCAGTCTGTA AAAGCTCATG GCTCCACCAG CGCTGCCAGT  2300

PGTCD      2301 .......... .......... .......... .......... ..........  2350
BOVGSTA    2301 .......... .......... .......... .......... ..........  2350
MUSGLYTNS  2301 CCAGGCCCCA GTAGGCTATT GTTTCTGTCC TCCCCATAAA CCACCCACAC  2350

PGTCD      2351 .......... .......... .......... .......... ..........  2400
BOVGSTA    2351 .......... .......... .......... .......... ..........  2400
MUSGLYTNS  2351 AGTCCCAATA CCTACTTTCC TCCCACATCT TCACAGTCCA CCAAAAATCA  2400

PGTCD      2401 .......... .......... .......... .......... ..........  2450
BOVGSTA    2401 .......... .......... .......... .......... ..........  2450
MUSGLYTNS  2401 AGCCTCACCA CTTACACCCA CATAGGACTT CCCCATTCCC ATTCAACTCA  2450

PGTCD      2451 .......... .......... .......... .......... ..........  2500
BOVGSTA    2451 .......... .......... .......... .......... ..........  2500
MUSGLYTNS  2451 GTTACAAACA CACACACCTT TCTTCAGCAT GACTAACACC ACCAATTGAA  2500
```

Fig. 4 (cont.) 4 - 5

```
PGTCD      2501 .......... .......... .......... .......... ..........  2550
BOVGSTA    2501 .......... .......... .......... .......... ..........  2550
HUSGLYTNS  2501 TCCAAAGTGT GTTCATTTTG TTTTGCCCAA ATTGTATTCA TGCTGTTAGC  2550

PGTCD      2551 .......... .......... .......... .......... ..........  2600
BOVGSTA    2551 .......... .......... .......... .......... ..........  2600
HUSGLYTNS  2551 TTTGTGTGTT CAGCCCTGTG GAGAGGGTGT GACTGTATCA GGGAACCACA  2600

PGTCD      2601 .......... .......... .......... .......... ..........  2650
BOVGSTA    2601 .......... .......... .......... .......... ..........  2650
HUSGLYTNS  2601 GTACCTCAGC CCACTCAGCA CCAGCACCCT ATTATATCAG AAGACAATCT  2650

PGTCD      2651 .......... .......... .......... .......... ..........  2700
BOVGSTA    2651 .......... .......... .......... .......... ..........  2700
HUSGLYTNS  2651 CTCATCATCA GGTCCTACCT ACAACCTGCT CTGAACCTCC CAGTTCCTCA  2700

PGTCD      2701 .......... .......... .......... .......... ..........  2750
BOVGSTA    2701 .......... .......... .......... .......... ..........  2750
HUSGLYTNS  2701 GCCCATCGTC TTCCACTCTG GCCCCCTGTA TCCACCACCT GACTGAACAC  2750

PGTCD      2751 .......... .......... .......... .......... ..........  2800
BOVGSTA    2751 .......... .......... .......... .......... ..........  2800
HUSGLYTNS  2751 AAAGCCCCCT GTCACATCAC CTCATTTCCC CTGCCTCTAC TACTATGCAG  2800

PGTCD      2801 .......... .......... .......... .......... ..........  2850
BOVGSTA    2801 .......... .......... .......... .......... ..........  2850
HUSGLYTNS  2801 TGTGACAGCC AGCCAGCCAG ATGTACTGCA CAACATAGCA ACCCACTTTA  2850

PGTCD      2851 .......... .......... .......... .......... ..........  2900
BOVGSTA    2851 .......... .......... .......... .......... ..........  2900
HUSGLYTNS  2851 TGCCATGCCG AGCCCCAGTC ACTACAACCC ACCTGCTCAA CGTTCTGTTC  2900

PGTCD      2901 .......... .......... .......... .......... ..........  2950
BOVGSTA    2901 .......... .......... .......... .......... ..........  2950
HUSGLYTNS  2901 CCCGCTCTGA CAGCCTGCAG GAGCCCCTGT ATAGGTGGTT CTCAACCTAT  2950

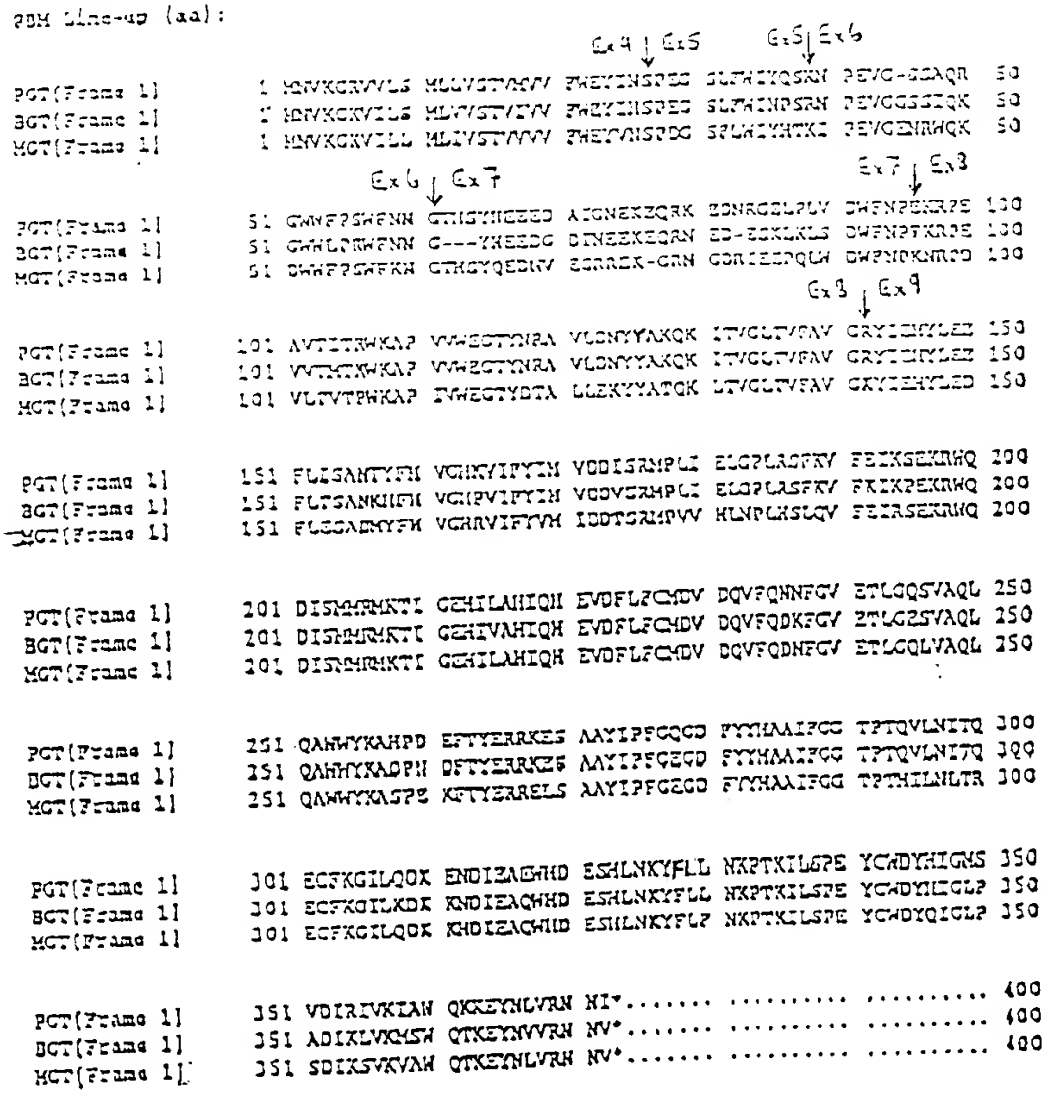
PGTCD      2951 .......... .......... .......... .......... ..........  3000
BOVGSTA    2951 .......... .......... .......... .......... ..........  3000
HUSGLYTNS  2951 CGGTCCCCAC CCCTTTGGCA AGTGTTAAAT GACCCTTTCA CAGGTGTCCC  3000

PGTCD      3001 .......... .......... .......... .......... ..........  3050
BOVGSTA    3001 .......... .......... .......... .......... ..........  3050
HUSGLYTNS  3001 CTAACACCGT TAAAAAACAT AGATATTTCC ACTCTGACTC GTAACAGTAG  3050

PGTCD      3051 .......... .......... .......... .......... ..........  3100
BOVGSTA    3051 .......... .......... .......... .......... ..........  3100
HUSGLYTNS  3051 CACAATTACA GTTATGAAAT AGCAAGGGAA ATAATTCTGG CGTTCGTGTC  3100
```

Fig 5

PBM Line-up (aa):



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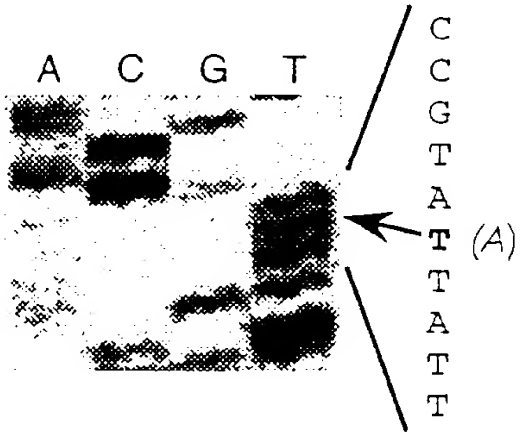
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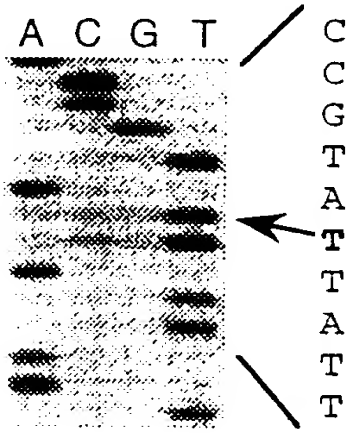
C C G T A T T A T T
(A)

B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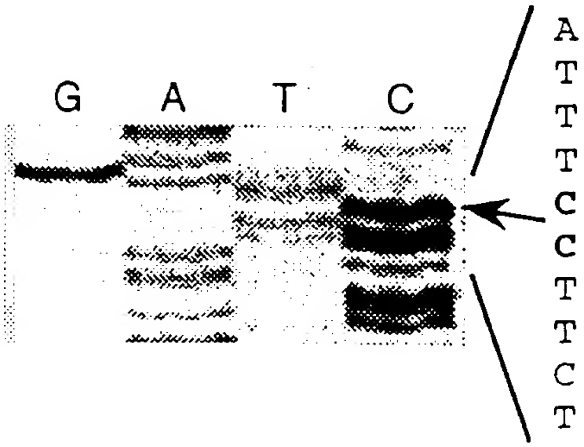
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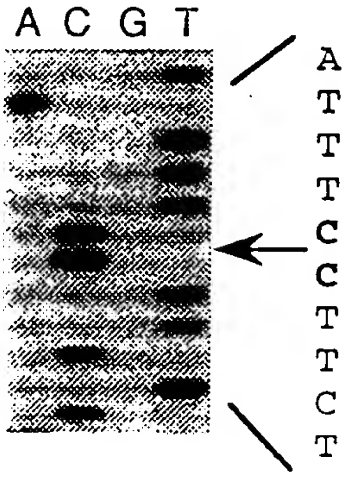
D


A C G T
A T T T C C T T C T